National Institute of Environmental Health Sciences

Analog European heat waves for US cities to analyze impacts on heat-related mortality

Author(s): Kalkstein LS, Greene JS, Mills DM, Perrin AD, Samenow JP, Cohen JC
Year: 2008
Journal: Bulletin of The American Meteorological Society. 89 (1): 75-+

Abstract:

Europe experienced an unprecedented excessive heat event (EHE) in 2003, raising the question: What if a similar EHE were experienced in U.S. cities? This study used an airmassbased meteorological method to develop analogs to the 2003 European EHE for five U.S. cities: Detroit, New York, Philadelphia, St. Louis, and Washington, D.C.; and calculated the potential excess mortality for these analogs., Analogs capture the 2003 EHE's characteristics by determining daily deviations from long-term averages for meteorological variables in Paris, France, expressed as a multiple of the standard deviation for each variable's long-term average. The 2003 daily multiples of the standard deviation measured in Paris for 12 meteorological variables, and daily maximum and minimum temperatures, were transferred to each U.S. city, and multiplied by the corresponding standard deviation calculated for each variable, to produce analog meteorological variables. With these data, an airmass calendar for each city was developed, and excess mortality was calculated using existing city-specific airmass algorithms. Results show the analog EHEs breaking all-time records for maximum and high minimum temperatures in all five cities. Excess heat-related mortality for the analog summer is 2 to over 7 times the long-term average, with New York showing the greatest increases. In all cities, calculated excess heat-related mortality for the analog summer exceeds the hottest recorded summer in 35 yr. These study results could be valuable for public health planning and a wide range of additional reliability or sensitivity analyses.

Source: http://dx.doi.org/10.1175/bams-89-1-75

Resource Description

Early Warning System: ☒

resource focus on systems used to warn populations of high temperatures, extreme weather, or other elements of climate change to prevent harm to health

A focus of content

Exposure : ☒

weather or climate related pathway by which climate change affects health

Meteorological Factors, Temperature, Other Exposure

Temperature: Extreme Heat

Other Exposure: dew point; cloud cover

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Injury, Other Health Impact

Other Health Impact: heat related mortality

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Methodology

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Historical

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content